

SECRET

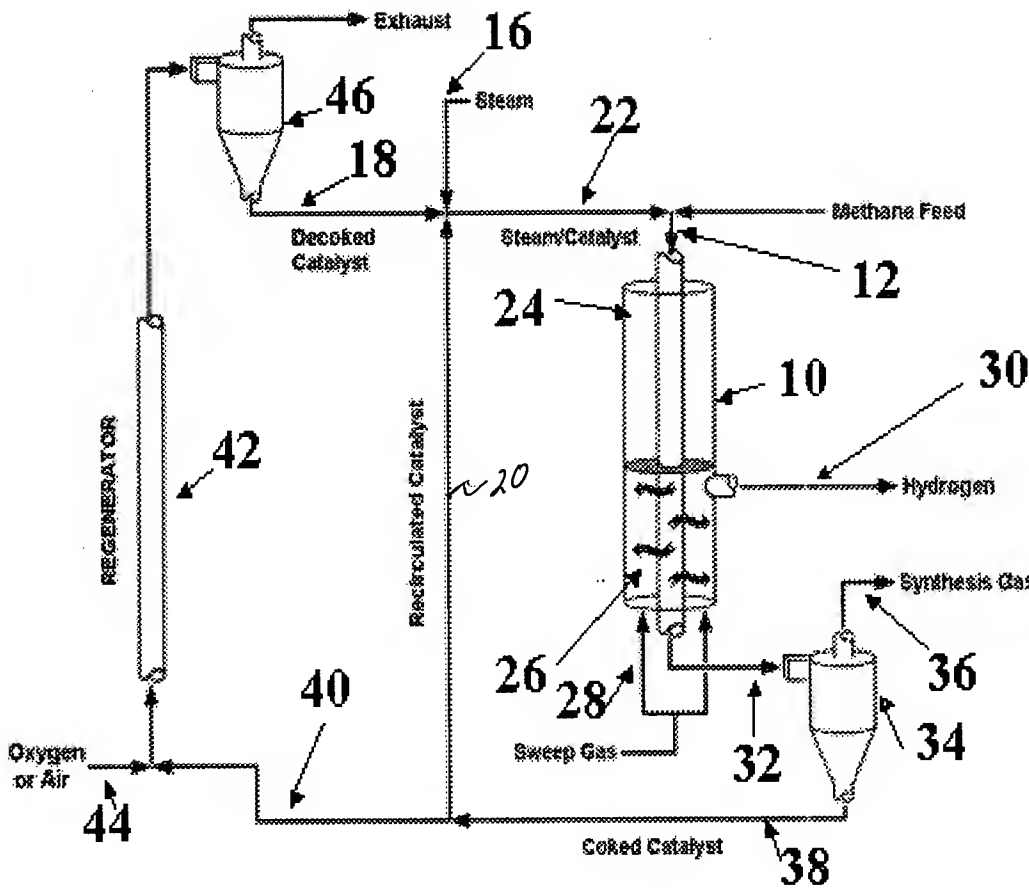


Figure 1

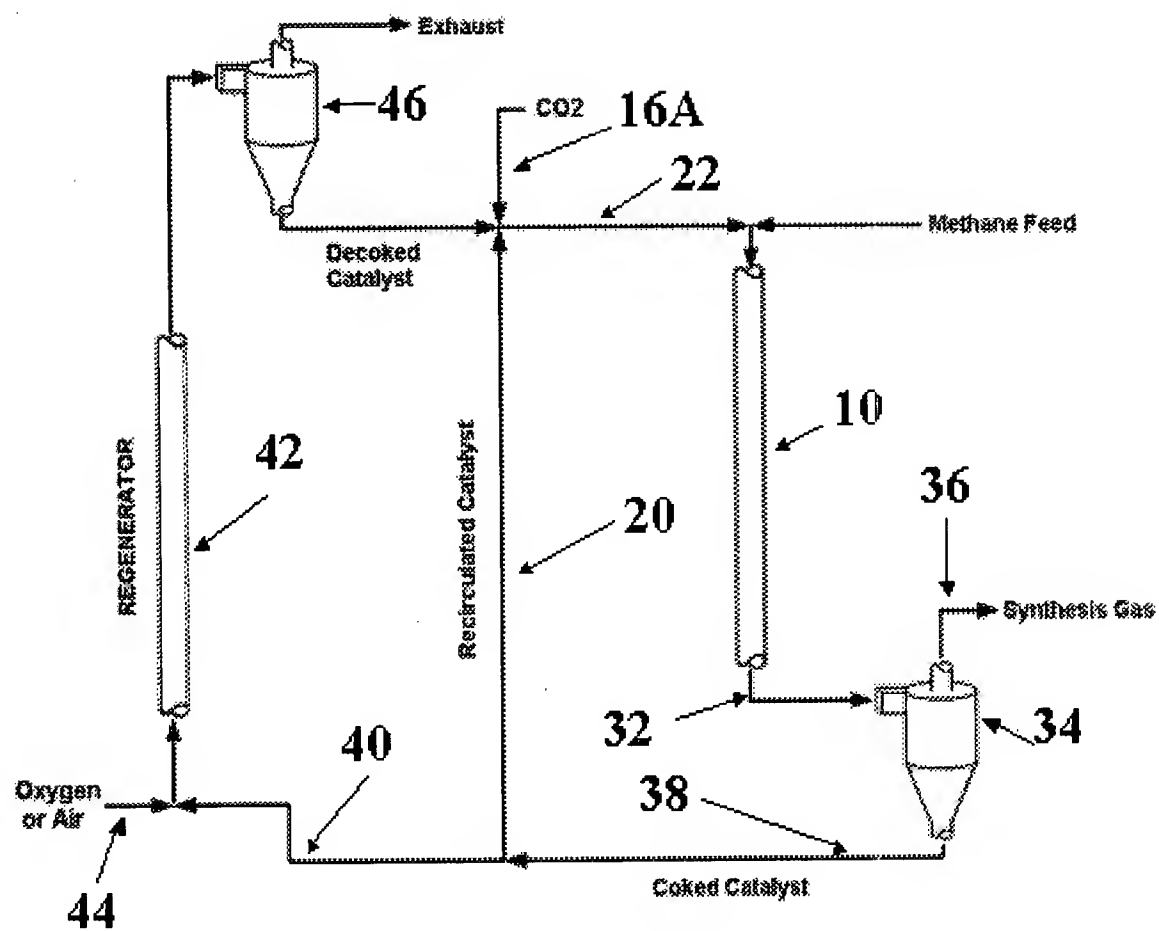


Figure 2

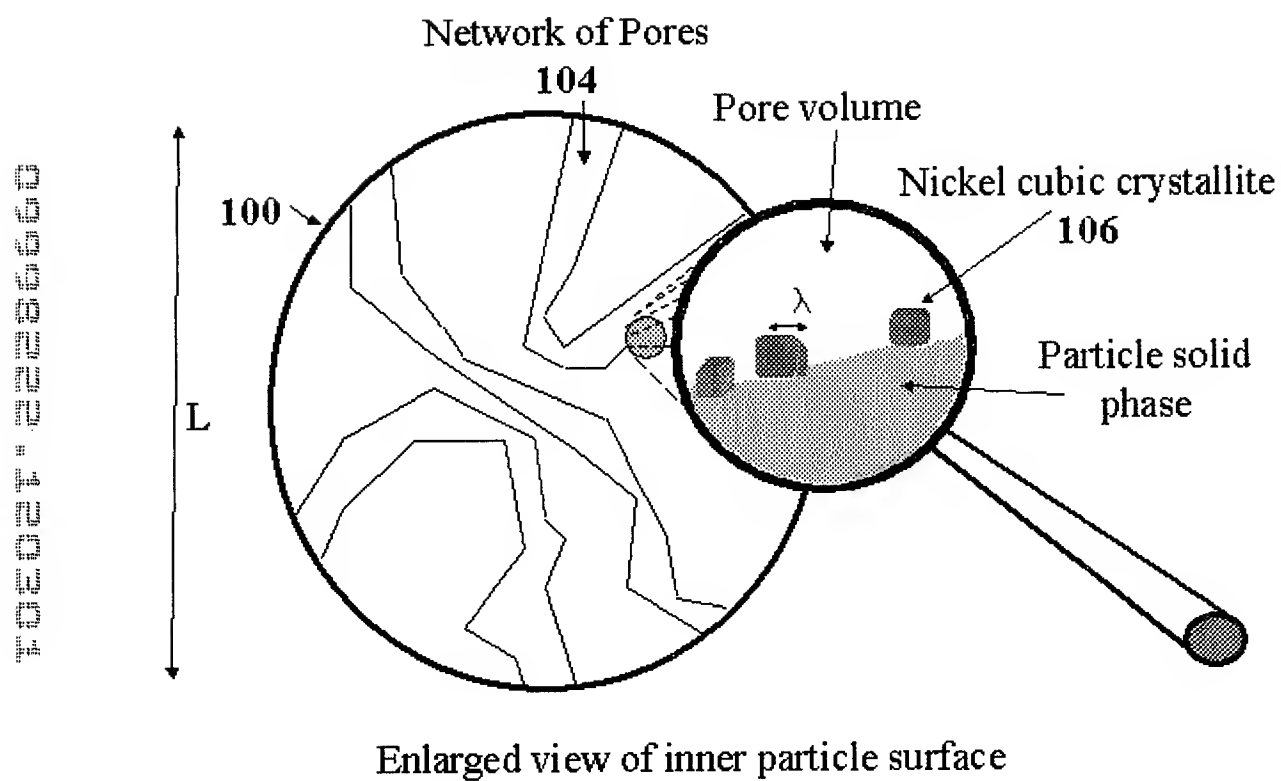


Figure 3

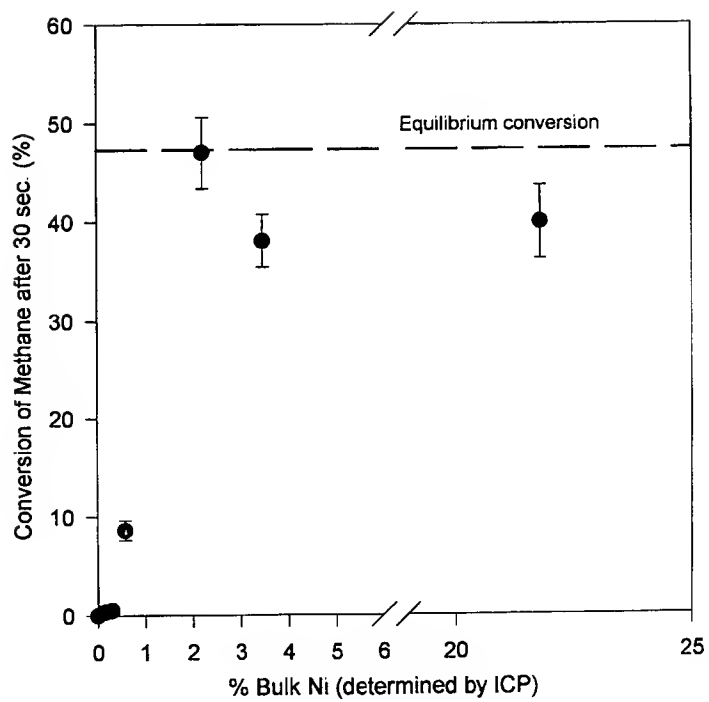
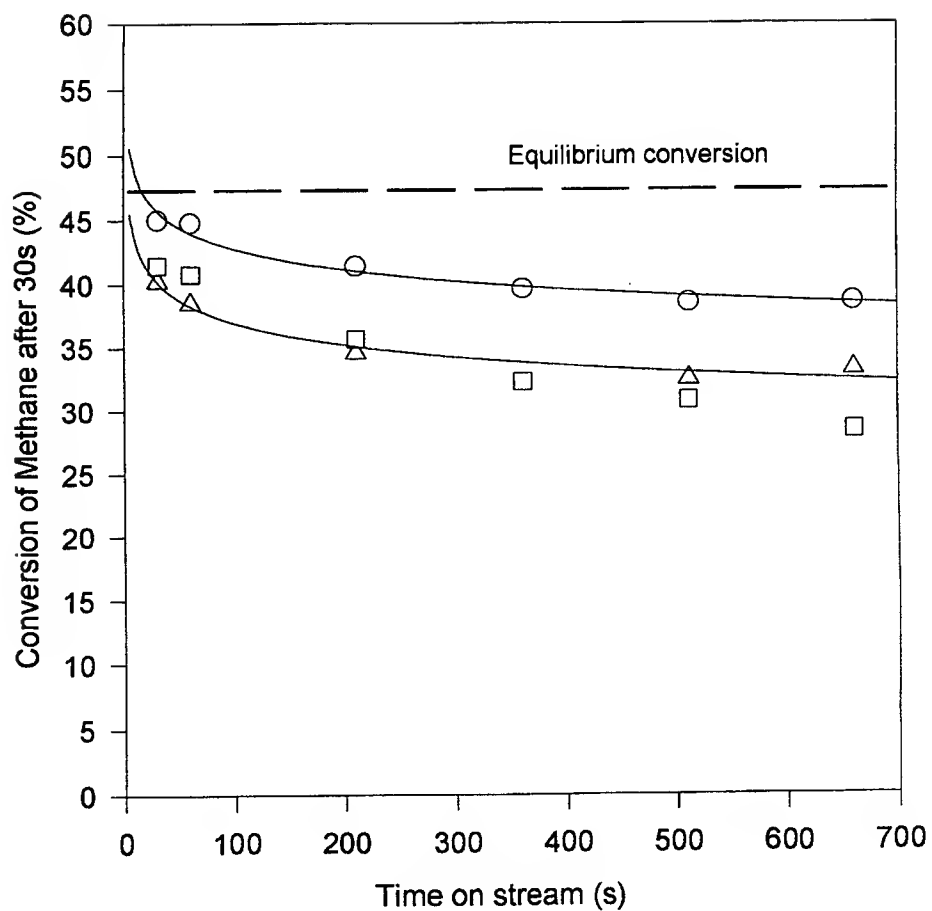


Figure 4



- Crystal size=179 Å, Dispersion=0.14 m²Ni/m²support
- Crystal size= 529 Å, Dispersion=0.058 m²Ni/m²support
- Crystal size=1929 Å, Dispersion=0.04 m²Ni/m²support

Figure 5

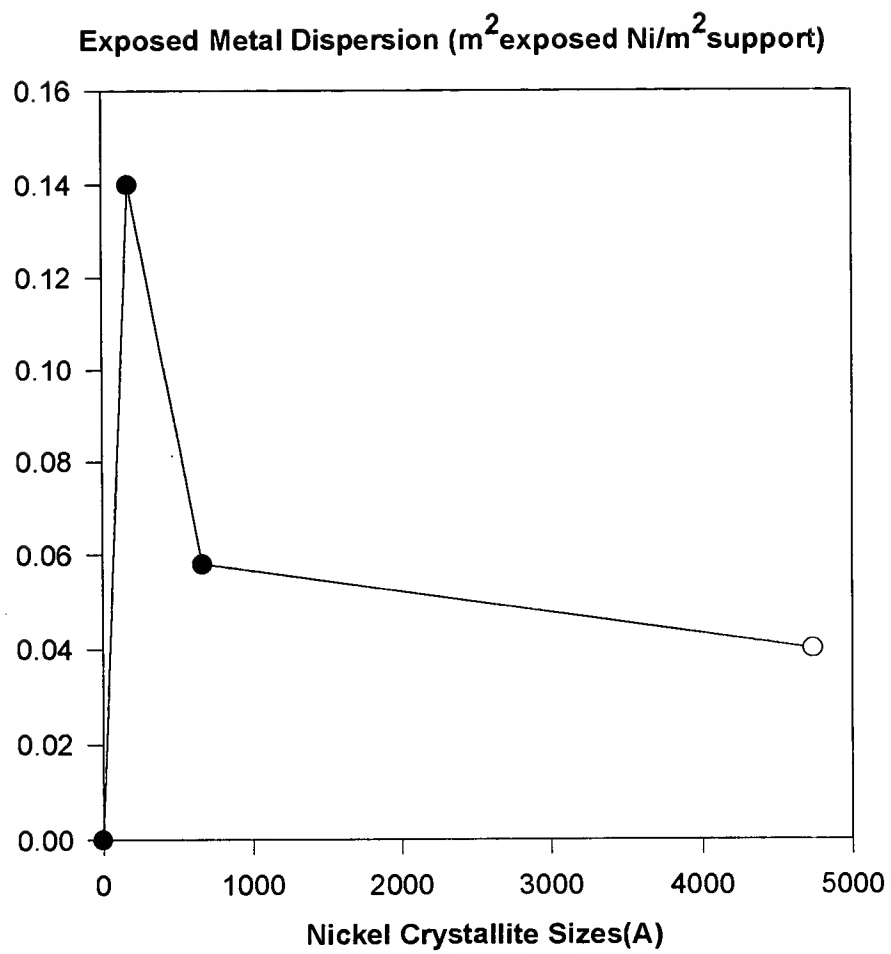
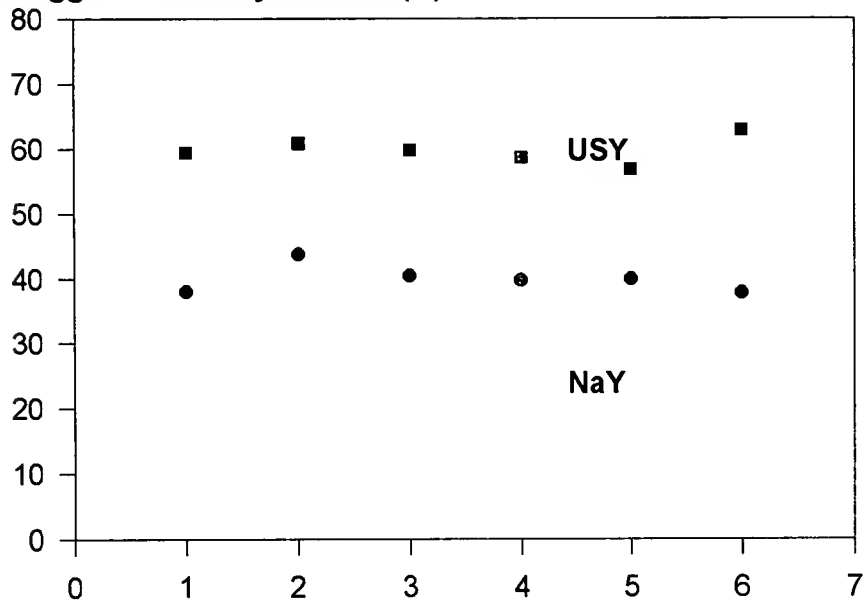
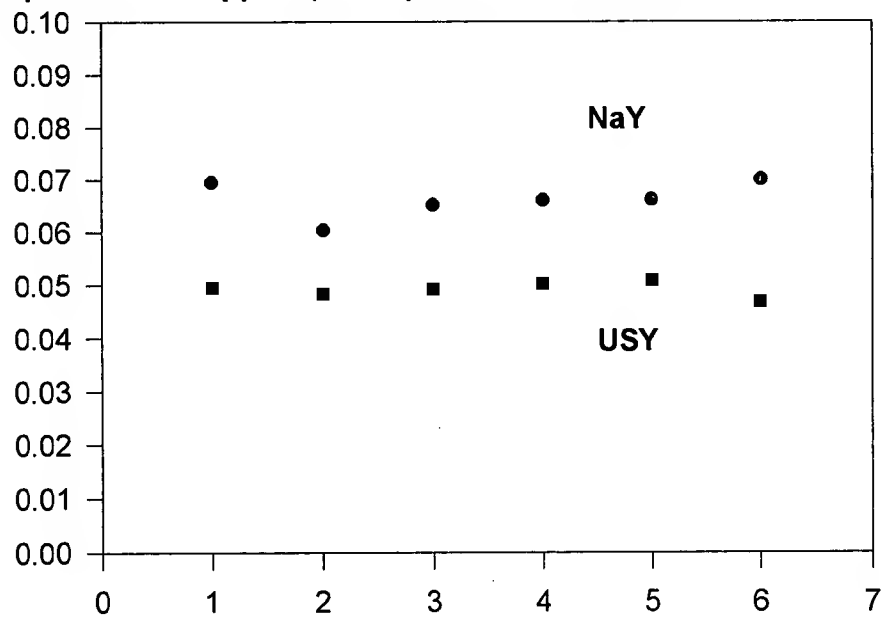


Figure 6

Ni Agglomerate Crystal Size (Å)

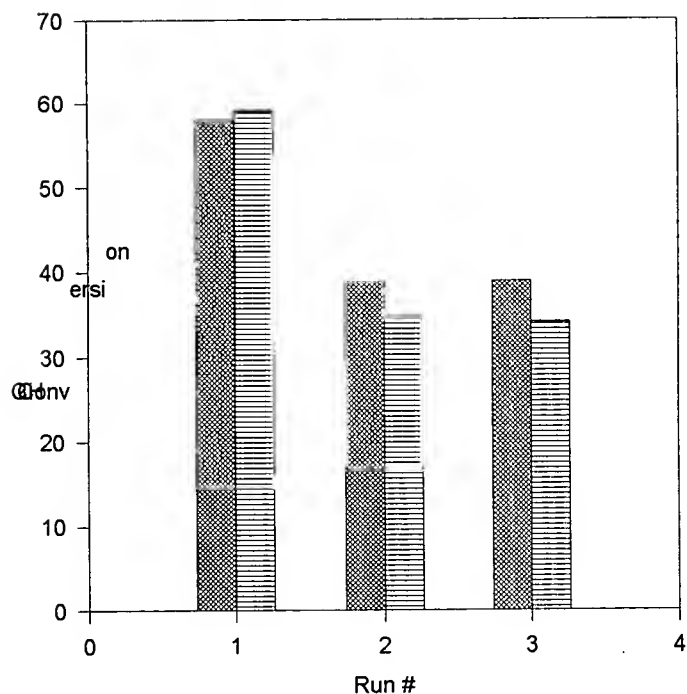


Ni Dispersion on support (m^2 exposed Ni/ m^2 catalyst)



Number of Oxidation Reduction Cycles

Figure 7



1 - 750°C, 60 psi, 40 sec

2 - 700°C, 95 psi, 15 sec

3 - 700°C, 92 psi, 15 sec

1. USY, Crystal size=40A, Dispersion=0.05 m²Ni/m²support; T=750 C, 60 psi, 40 s.
 2. USY, Crystal size=40A, Dispersion=0.05 m²Ni/m²support; T=750 C, 95 psi, 15s.
 3. USY, Crystal size=40A, Dispersion=0.05 m²Ni/m²support; T=750 C, 92 psi, 15s.
- Note: Dry reforming of methane using USY zeolites. The left hand side bars represent chemical equilibrium values the right hand side bars the actual methane conversion values in the riser simulator. Note that the CH₄/CO₂ ratios for all these runs are 1.

Figure 8